5λ

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,092	08/21/2001	Bernardus Hendrikus Wilhelmus Hendriks	PHN 17,870	9202

24737 7590 06/09/2004

PHILIPS INTELLECTUAL PROPERTY & STANDARDS
P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER	
BATTAGLIA, MICHAEL V	
ART UNIT	**PAPER NUMBER**
2652	7

DATE MAILED: 06/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No.	Applicant(s)
	09/914,092	HENDRIKS ET AL.
	Examiner	**Art Unit**
	Michael V Battaglia	2652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 April 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 April 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

This action, dated June 1, 2004, is in response to Applicant's amendment, filed April 2, 2004. Claims 1-20 are pending.

Drawings

1. Corrected drawings were received on April 2, 2004. These drawings are acceptable.

Claim Objections

2. Claim 16 is objected to because of the following informality. On line 1 of claim 16, the examiner suggests replacing "is" with -are-. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. Claims 1-2, 4-10, and 12-14 rejected under 35 U.S.C. 102(e) as being anticipated by Maruyama (US 6,191,889).

In regard to claim 1, Maruyama discloses an optical head for scanning an optical record carrier having an information layer (Col. 1, lines 5-10), the head comprising a radiation source for generating a radiation beam (Col. 2, lines 7-10), an optical system for converging the radiation beam to a focus on the information layer along an optical axis (Figs. 1A-1B, element 10 and Col. 4, lines 28-30), the optical system imparting a temperature-dependent first wavefront deviation to the radiation beam (Col. 1, lines 16-24), and a compensator arranged in the radiation beam for compensating the first wavefront deviation (Figs. 1A-1C, element 11), characterised in that the compensator comprises a phase structure of a material having temperature-dependent properties, the phase structure having the form of a plurality of annular areas forming a non-periodic pattern

of optical paths of different, temperature-dependent lengths (Fig. 1C and Col. 1, lines 66-67), the optical paths forming a second wavefront deviation compensating the temperature-dependent first wavefront deviation (Col. 1, lines 10-17 and Col. 4, lines 51-59), wherein the annular areas each have a width measured radially from the optical axis (Fig. 1A) and a consistent height measured along the optical axis (Fig. 1C). It is noted that an annular **area** inherently has a width measured radially from the center of the annular area and that the optical axis is interpreted as being at the center of the plurality of annular areas. Each annular area is interpreted as including a step and the area proceeding in the radial direction towards the outer circumference of the compensator from the step until the next step. The height of each annular area measured in along the optical axis is consistent in the circumferential direction.

In regard to claim 2, Maruyama discloses that the optical system comprises an objective system imparting spherical aberration as the first wavefront deviation to the radiation beam (Col. 4, lines 51-53).

In regard to claim 4, Maruyama discloses that the differences between the optical paths are multiples of the wavelength of the radiation beam for at least one temperature (Col. 4, lines 63-64).

In regard to claim 5, Maruyama discloses that at least one of the multiples is equal to two or larger (Col. 4, lines 63-64).

In regard to claim 6, Maruyama discloses that the temperature-dependence of the first wavefront deviation is due to the temperature dependence of the wavelength of the radiation beam generated by the radiation source (Col. 4, lines 41-46).

In regard to claim 7, Maruyama discloses a device for scanning an optical record carrier having an information layer, the device comprising an optical head according to Claim 1 and an information processing unit for error correction (Col. 5, lines 57-64).

In regard to claim 8, Maruyama discloses an optical system comprising an optical element (Figs. 1A-1B, element 10) and a compensator (Figs. 1A-1C, element 11), the optical element being arranged in the path of a radiation beam along an optical axis and imparting a temperature-dependent first wavefront deviation to the radiation beam (Col. 1, lines 16-24), the compensator being arranged in the path of the radiation beam for compensating the first wavefront deviation, characterized in that the compensator comprises a phase structure of a material having temperature-dependent properties, the phase structure having the form of a plurality of annular areas forming a non-periodic pattern of optical paths of different, temperature-dependent lengths (Fig. 1C and Col. 1, lines 66-67), the optical paths forming a second wavefront deviation compensating the temperature-dependent first wavefront deviation (Col. 1, lines 10-17 and Col. 4, lines 51-59), wherein the annular areas each have a width measured radially from the optical axis (Fig. 1A) and a consistent height measured along the optical axis (Fig. 1C). It is noted that an annular **area** inherently has a width measured radially from the center of the annular area and that the optical axis is interpreted as being at the center of the plurality of annular areas. Each annular area is interpreted as including a step and the area proceeding in the radial direction towards the outer circumference of the compensator from the step until the next step. The height of each annular area measured in along the optical axis is consistent in the circumferential direction.

In regard to claim 9, Maruyama discloses that the differences between the optical paths are multiples of the wavelength of the radiation beam for at least one temperature (Col. 4, lines 63-64).

In regard to claim 10, Maruyama discloses that the first wavefront deviation is spherical aberration (Col. 4, lines 51-53).

In regard to claim 12, Maruyama discloses that the optical element is a lens (Col. 1, line 9).

In regard to claim 13, Maruyama discloses that he optical element and the compensator are integrated in a single element (Figs. 1A-1B).

In regard to claim 14, Maruyama discloses that the optical system includes a diffractive structure (Col. 1, line 10).

In regard to claims 15 and 18, Maruyama discloses that the heights of the annular areas differ forming a step pattern proceeding radially from the optical axis (Fig. 1C and Col. 1, line 65-Col. 2, line 1).

In regard to claims 16 and 19, Maruyama discloses that the widths of the annular areas are substantially greater than the heights (Fig. 1C).

4. Claims 1-2, 4-5, and 8-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakai et al (hereafter Nakai) (US 6,590,708).

In regard to claim 1, Nakai discloses an optical head for scanning an optical record carrier having an information layer (Fig. 4, element 4 and Col. 1, lines 15-16), the head comprising a radiation source for generating a radiation beam (Col. 3, line 22), an optical system for converging the radiation beam to a focus on the information layer along an optical axis (Fig. 4 and Col. 2, lines 51-52), the optical system imparting a temperature-dependent first wavefront deviation to the radiation beam (Col. 1, lines 18-24 and Col. 3, lines 22-26), and a compensator arranged in the radiation beam for compensating the first wavefront deviation, characterised in that the compensator comprises a phase structure of a material having temperature-dependent properties, the phase structure having the form of a plurality of annular areas forming a non-periodic pattern of optical paths of different, temperature-dependent lengths, the optical paths forming a second wavefront deviation compensating the temperature-dependent first wavefront deviation (Fig. 4; Col. 1, line 25; and Col. 2, lines 22-29), wherein the annular areas each have a width measured radially

from the optical axis and a consistent height measured along the optical axis (Fig. 4, element 2). It is noted that an annular **area** inherently has a width measured radially from the center of the annular area and that the optical axis is interpreted as being at the center of the plurality of annular areas. Each annular area has a consistent height measured along the optical axis in the circumferential direction.

In regard to claim 2, Nakai discloses that the optical system comprises an objective system imparting spherical aberration as the first wavefront deviation to the radiation beam (Col. 2, lines 27-28).

In regard to claim 4, Nakai discloses that the differences between the optical paths are multiples of the wavelength of the radiation beam for at least one temperature (Col. 3, lines 40-44).

In regard to claim 5, Nakai discloses that at least one of the multiples is equal to two or larger (Col. 3, lines 40-44).

In regard to claim 8, Nakai discloses an optical system comprising an optical element (Fig. 4, element 5 (refracting portion)) and a compensator (Fig. 4, element 2 (diffracting portion)), the optical element being arranged in the path of a radiation beam along an optical axis and imparting a temperature-dependent first wavefront deviation to the radiation beam (Col. 1, lines 18-24 and Col. 3, lines 22-26), the compensator being arranged in the path of the radiation beam for compensating the first wavefront deviation, characterized in that the compensator comprises a phase structure of a material having temperature-dependent properties, the phase structure having the form of a plurality of annular areas forming a non-periodic pattern of optical paths of different, temperature-dependent lengths, the optical paths forming a second wavefront deviation compensating the temperature-dependent first wavefront deviation (Fig. 4; Col. 1, line 25; and Col. 2, lines 22-29), wherein the annular areas each have a width measured radially from the optical axis

and a consistent height measured along the optical axis (Fig. 4, element 2). It is noted that an annular **area** inherently has a width measured radially from the center of the annular area and that the optical axis is interpreted as being at the center of the plurality of annular areas. Each annular area has a consistent height measured along the optical axis in the circumferential direction.

In regard to claim 9, Nakai discloses that the differences between the optical paths are multiples of the wavelength of the radiation beam for at least one temperature (Col. 3, lines 40-44).

In regard to claim 10, Nakai discloses that the first wavefront deviation is spherical aberration (Col. 2, lines 27-28).

In regard to claim 11, Nakai discloses that the first wavefront deviation is defocus (Col. 2, line 27).

In regard to claim 12, Nakai discloses that the optical element is a lens (Col. 3, lines 15-26).

In regard to claim 13, Nakai discloses that he optical element and the compensator are integrated in a single element (Fig. 4).

In regard to claim 14, Nakai discloses that the optical system includes a diffractive structure (Col. 3, lines 15-26).

In regard to claims 15 and 18, Nakai discloses that the heights of the annular areas differ forming a step pattern proceeding radially from the optical axis (Col. 7, lines 2-4).

In regard to claims 17 and 20, Nakai does not specifically disclose that the annular areas cause an integral number of 2π phase changes in the radiation beam. However, Nakai uses the annular areas to keep optical characteristics substantially unvarying against temperature variations. When no temperature variation occurs, no adjustment to the phase of the radiation beam is needed and the phase change imparted to the radiation beam by the annular areas will be an integral number of 2π phase changes.

Claim Rejections - 35 USC § 103

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maruyama in view of Ueyanagi et al (hereafter Ueyanagi) (US 6,154,326).

Maruyama discloses the optical head as claimed in claim 1. Maruyama further discloses that the optical system comprises an objective lens that imparts defocus as the first wavefront aberration to the radiation beam (Col. 5, lines 57-64). The examiner notes that the focus adjusting mechanism (Col. 5, lines 63-64) is interpreted as part of compensator. Maruyama does not disclose a collimator lens, arranged closer to the radiation source than the objective lens, as part of the optical system.

Ueyanagi discloses reducing defocus deviation due to temperature change by arranging a collimator lens closer to the radiation source than the objective lens (Col. 11, lines 44-48).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include in the optical system of Maruyama, a collimator lens arranged closer to the radiation source than the objective lens as suggested by Ueyanagi, the motivation being to reduce defocus wavefront aberration caused by temperature change.

Response to Arguments

6. Applicant's arguments, see pages 5 and 6, filed April 2, 2004, with respect to the rejections of claims anticipated by Maruyama and Nakai have been fully considered but they are not persuasive. Applicant argues that Maruyama and Nakai disclose diffraction gratings and not phase structures and that the claim amendments recite structural limitations of the phase structure of the claimed invention that distinguish it from the diffraction gratings of Maruyama and Nakai. However, the diffraction gratings of Maruyama and Nakai are phase structures because they

change the optical path lengths of the radiation beams that travel through them and as a result, change the phase of the radiation beams that travel through them. The amendments to the claims do not distinguish the phase structure of the claimed invention from the diffraction gratings of Maruyama and Nakai for the reasons given in the claim rejections above.

7. Applicant's arguments, see page 5, filed April 2, 2004, with respect to claims 15-20 have been fully considered but they are not persuasive. Claims 15-20 recite features of the compensator and phase structure that are disclosed or suggested by the cited references as shown above in the claim rejections.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V Battaglia whose telephone number is (703) 305-4534. The examiner can normally be reached on 5-4/9 Plan with 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. Battaglia

Michael Battaglia

W. R. YOUNG
PRIMARY EXAMINER